DRAFT SF 298

1. Report Date (dd-mm-yy) 041193	2. Report Type Final	3. Dates covered (from... to)
4. Title & subtitle A Benchmarking Report on Functional Process Improvement		5a. Contract or Grant #
		5b. Program Element #
6. Author(s)		5c. Project #
		5d. Task #
		5e. Work Unit #
7. Performing Organization Name & Address Office Of The Assistant Secretary Of Defense (Command, Control, Communications, and Intelligence) Arlington VA		8. Performing Organization Report #
9. Sponsoring/Monitoring Agency Name & Address		10. Monitor Acronym
		11. Monitor Report #
12. Distribution/Availability Statement Unlimted/Unclassified		
13. Supplementary Notes		

DTIC
SELECTE
DEC 0 7.1995
G

14. Abstract During the period from August 23, 1993 to September 15, 1993, the Assistant for Business Process Improvement (DASD/IM) conducted an external benchmark study to discover best practices of business process improvement. This study is one of the ongoing efforts to improve the Department of Defense methodology for functional process improvement. Process improvement is itself a process and is subject to the same requirements for continuous improvement as are all functional processes in the Department. Benchmarking is an integral component of improvement efforts. Infact, competition for the Malcolm Baldrige National Quality Award mandates the use of continuous benchmarking to set performance targets and to uncover best business practices.

19951207 004

15. Subject Terms CIM(Collection)

Security Classification of			19. Limitation of Abstract	20. # of Pages	21. Responsible Person (Name and Telephone #)
16. Report Unclassified	17. Abstract Unclassified	18. This Page Unclassified	Unlimited		Questions, call 800-225-3842 x4 (CIM Help Desk) or 800-TELLCIM (Don Pargoff)

Accesion For
NTIS CRA&I [X]
DTIC TAB [ ]
Unannounced [ ]
Justification
By
Distribution /
Availability Codes
Dist | Avail and / or Special
A-1

A Benchmarking Report on Functional Process Improvement

Conducted by:

Office of the Assistant Secretary of Defense

Command, Control, Communications, and Intelligence

(In search of Excellence...)

04 NOVEMBER 1993

[THIS PAGE IS INTENTIONALLY BLANK]

Table of Contents

Introduction 5

Background 5

Statement of Purpose 7

Executive Summary 7

Benchmark Partners 12

Benchmark Project Team 13

Team Process 13

Project Calendar 15

Subjects Benchmarked 16

Benchmark Partner Profiles 20
- Partner A 20
- Partner B 22
- Partner C 27
- Partner D 30
- Partner E 33
- Partner F 36
- Partner G 39
- Partner H 43
- Partner I 45
- Partner J 48
- Partner K 51
- Partner L 53

Table of Contents

Benchmark Program Analysis 55
Critical Success Factors for Process Improvement/Reengineering 56
CSF Comparison Table 57

Conclusions and Recommendations 58

Next Steps 62

APPENDIX A 63
Department of Defense Process Improvement Program Profile 63

APPENDIX B 70
Framework for Managing for Process Improvement 70
Management Framework Organization (Chart 1) 74
Methodology Phases and Steps (Chart 2A) 75

Introduction

During the period from August 23, 1993 to September 15, 1993, the Assistant for Business Process Improvement (DASD/IM) conducted an external benchmark study to discover best practices of business process improvement. This study is one of the ongoing efforts to improve the Department of Defense methodology for functional process improvement. Process improvement is itself a process and is subject to the same requirements for continuous improvement as are all functional processes in the Department. Benchmarking is an integral component of improvement efforts. In fact, competition for the Malcolm Baldrige National Quality Award mandates the use of continuous benchmarking to set performance targets and to uncover best business practices.

Background

> **The Department of Defense Corporate Information Management (CIM) initiative is the most comprehensive information program ever conducted by any U.S. government or private sector business organization...The CIM initiative calls for major reengineering and restructuring of business methods and administrative processes.**
>
> -- Cynthia Kendall [DASD (IM)], 1993

The Department's reengineering program, which is entitled Functional Process Improvement (FPI), includes the following key objectives:

- Standardization of like processes across DoD to effect economies of scale and reflect best business practices
- Direct linkage of process performance to strategic plans, monitored through the use of metrics and measures
- Cross-functional Integration of major business processes to streamline process performance and reduce waste and duplication of effort
- Application of standard methodologies, techniques, and tools for process improvement

- Introduction of an entrepreneurial culture which promotes employee initiative and responsible risk-taking in support of internal and external customer needs

- Functional management responsibility for insuring the development and deployment of information management systems for redesigned functional processes.

The Assistant for Business Process Improvement Program (BPIP) is charged with supporting the Functional Process Improvement Program (FPIP) as described in DoD 8020.1-M Functional Process Improvement. Because of the complexity and size of DoD, a key element of this program is the adoption of a common and standard methodology that can be used throughout the Department to guide process improvement, design, and reengineering efforts.

On May 21, 1993, based on extensive research and analysis of the technical literature, the Assistant for BPIP published a draft methodology called *Management Framework for Process Improvement (MF/PI) Guidebook*. This guidebook (to be retitled *The Framework for Managing Process Improvement*) has been favorably reviewed by elements within the Department as well as by other Federal Agencies and DoD contractors. Based on the review comments and additional research and analysis, it was determined that the methodology, while conceptually sound, needed further refinements before publication. This benchmark study was conducted, in part, to support the effort to refine the methodology.

The *Framework for Managing Process Improvement Guidebook* is designed for use by functional managers as change agents for process improvement within their own organization. The methodology, described in the guidebook, relies on metrics and measurements to provide a means of relating functional unit strategy, goals and objectives with process improvement initiatives; and improvement initiatives with change management, improved process implementation, and the design, development and deployment of related information systems . The methodology is organized into five phases:

- Strategic Planning
- Business Planning
- Process Improvement Analysis
- Process improvement Design
- Improved Process Implementation

Statement of Purpose

The purpose of the benchmark study was to compare and contrast the Department's process improvement program and methodologies with those in use in large organizations in both the public and private sectors. We identified 30 such organizations based on a literature search of organizations known to be actively engaged in process improvement and/or business reengineering programs. Of these, we selected 12 for our study which we believed were most relevant with respect to our program. Our benchmark partners are listed in the section of this report entitled **Benchmark Partners**.

We were interested in understanding the context for process improvement in each organization so that we could properly evaluate and improve our programs and methodology. The specific subjects benchmarked are listed later in this report.

A secondary purpose of the benchmark study was to collect literature related to process improvement and their supporting methodologies. In some cases, this was considered proprietary information; but in most cases, the benchmark partners freely shared information about their programs.

A tertiary purpose of the study was to informally discuss with leading proponents process improvement issues related to organization, leadership, expectations, funding, measures, participation, acceptance, results, implementation considerations, change management, obstacles, problems, and plans for the future. This was a most valuable part of the benchmark exercise because it gave the benchmark team a chance to validate assumptions related to process improvement, to note issues that require further investigation, and to identify potential improvement opportunities.

Executive Summary

In general, we discovered that most of the organizations we visited are viewing Total Quality Management as a business management principle and Business Reengineering (or process improvement) as a service performed in the organization through the auspices of an in-house consulting staff. Most organizations feel that having a written methodology in place is one of the keys to successful conduct of an improvement program. In these organizations, the methodology helps in the coordination of quality and process improvement programs.

Several organizations are using the Malcolm Baldrige National Quality Award and/or the ISO 9000 certification criteria as guidelines for establishing and conducting their improvement program. Some have internal awards, such as a president's quality award or the equivalent.

In most organizations, quality improvement and process improvement are driven from the office of the President or CEO, but with varying levels of intensity. *Top management commitment was seen as the most critical success factor by all benchmark partners.*

While there was generally no mandate to rely on the internal business reengineering staff, we found limited use of outside consultants except when a specific skill or service is required. Most organizations pay for their improvement efforts in part with budgeted funds and in part with fees for service collected from their internal customers.

Most organizations employ a wide range of quality management and process improvement tools including benchmarking, Taguchi's seven quality and seven management tools, activity-based costing, and some form of process and data modeling. We found that most of the techniques and tools described in the draft F/MPI Guidebook are used by our benchmark partners with varying degrees of intensity. *Surprisingly, we did not find evidence of a technique or tool being used that was not described in the draft F/MPI guidebook.*

We found that most organizations use manual, highly visible tools such as storyboarding, wallcharts, and graphs, as a communications vehicle. Groupware and automated tools, such as modeling, simulation, and time line analysis, are not yet widely used by some of our benchmark partners largely because they were not yet aware of the capability of such tools.

Quality Function Deployment (QFD) techniques are just starting to be used to capture the "voice of the customer." QFD, long popular in Japan, is increasingly being applied by American product and service-oriented based companies. Whether this technique is used or others, virtually all benchmark partners placed a high premium on basing improvement efforts on customer needs, expectations, requirements, and desires.

Almost all organizations placed a high premium on the need for an aggressive change management program in conjunction with process improvement efforts. This position is also strongly supported in the literature on process improvement. Several cited change management as 50% to 60% of the total effort. Change management addresses such issues as management practice, team practice, employee empowerment, reduction of rules and regulations, rewards and recognition systems, training, and career path management.

Virtually all of the private sector organizations we visited have or are undergoing downsizing, and several stated that this has actually helped overcome internal resistance to process improvement efforts. None of our benchmark partners said that process improvement or process reengineering *resulted* in downsizing or layoffs. Most partners agreed with the statement that downsizing would have or could have been avoided if process improvement and reengineering techniques had been in place soon enough.

There is a wide variance on how processes are selected for improvement. In some cases, the internal customer requests the services of the process improvement group; in others, the improvement group seeks out processes for improvement; and in still others, processes are selected by corporate or division management. There is also a wide variance in the level of process improvement. Some organizations are primarily streamlining processes while others are doing extensive reengineering work.

Two or three of the organizations we visited have established two separate internal groups: one group focuses on continuous improvement through a quality office; the other reengineering. The remaining organizations have consolidated all improvement efforts into one office. The question of where to place the business reengineering function (information management or another function) did not seem to be an issue. It was important in most organizations for the executive in charge of business reengineering to have a peer relationship with functional division managers.

While metrics, measures, and critical success factors related to process improvement were considered important by all of our benchmark partners, we found that there is still a high reliance on subjective measures, both in selecting processes for improvement and in measuring results. In most cases, *the responsibility for choosing performance measures was considered to be within the purview of the functional manager or area, rather than the process improvement office.*

We found a wide variance in the way that process improvement programs are evaluated. Most expected a significant (if not huge) return on the invested cost of improving processes, but few organizations would or could tell us how they calculate the return. All of our partners felt that this is an area that needs immediate attention. In the **Benchmark Partner Profiles** section of this report, we report the methods each partner uses to determine the return on process improvement investments.

Like most large enterprises, the information management systems in place are primarily mainframe-based and were originally designed 10 or more years ago. Most of our benchmark partners are just starting to reengineer these systems as a result of their process redesign efforts. All believe that reengineering the underlying business processes must precede redevelopment of related information systems.

We did not find much emphasis on using automated tools for process improvement that would feed into Computer-Aided Systems Engineering (CASE) tools. We were surprised by this finding because we feel that this is critical to the success of our program in DoD, given the size and complexity of our installed legacy system base.

Our benchmark partners were not as concerned about cross-functional integration and its impact on automated information systems development and deployment as we are. In all but one case, we found the complete lack of a formal data administration program in conjunction with process improvement or reengineering. We attribute this to the fact that most of our benchmark partners are practicing process reengineering only *within* major functional areas (divisions). We believe that in order to effectively operate a large enterprise, a responsive and accurate information infrastructure is a must. That is, where end-to-end processes must be managed through functionally separate departments, this requires a shared-data concept that can only be developed when functional integration and data administration are made part of the process reengineering mission.

Training for the process improvement staff, process action team, and business managers were important items, as expected, but we did not find an emphasis on just-in-time media-based training systems. Most organizations use instructor-led methods for training. However, we continue to feel a strong need to explore electronic (Distance Learning) techniques to implement just-in-time training and reduce expenses associated with classroom-based learning. We believe this difference in emphasis is explained by the fact that most of our benchmark partners keep their process action teams physically together for several months at a time, while in DoD we combine

intensive workshop activities with periods when the process action team members work "offline" back in their own activity.

The draft F/MPI Guidebook was sent to each benchmark partner for their review prior to our on-site visit. We asked for comments and suggestions related to the guidebook. We received some helpful comments, which we will incorporate into the next edition. Some benchmark partners felt that a methodology at that level of detail was more than their own organizations require, but thought that it might be appropriate for an organization as large and complex as DoD. Only one of our partners (public sector organization) had a similar document with approximately the same volume and level of detail as the draft F/MPI Guidebook.

The results of our benchmark study are summarized in the **Benchmark Analysis** section of this report. The data contained in that section were extracted from the individual partner profiles, which make up the body of this report. Each should be read to better understand the context for our analysis. As noted in the **Statement of Purpose**, we do not attribute any data in this report to its source, which was one of the ground rules of the benchmark study. We went on to draw our own conclusions from this analysis and prepared some recommendations. These are described in the **Conclusions and Recommendations** section of the report. We prepared a brief description of the DoD Process Improvement Program for the benefit of our benchmark partners, which is reproduced as **Appendix A** of this report. **Appendix B** contains a summary description of our draft *Framework for Managing Process Improvement Guidebook* methodology.

Benchmark Partners

Our benchmark population consisted of the 12 organizations listed below. We met with, or talked with, the senior manager in charge of process improvement or process reengineering at each location. In some cases, this person met with us alone; in others, from one to six additional staff members participated in the interview. *Because we do not want to restrict the distribution of this benchmark report*, we are not identifying the individuals who participated in the study in order to protect their privacy. Nor are we attributing specific comments in this report to the source organization. These conditions were established as ground rules with our partners for the benchmark study. We believe these ground rules facilitated a candid discussion of the issues, especially with respect to problems, unresolved issues, and lessons learned. Those organizations that we visited are marked with the ⌂ icon; those we interviewed by phone as marked with the ☎ symbol.

SYMBOL	ORGANIZATION	LOCATION
⌂	Pacific Bell	San Ramon, California
☎	Eastman Kodak	Rochester, New York
⌂	Westinghouse	Pittsburgh, Pennsylvania
☎	Federal Express	Memphis, Tennessee
⌂	Phillips Petroleum	Bartlesville, Oklahoma
☎	Connecticut Mutual	Hartford, Connecticut
⌂	Aetna Insurance	Hartford, Connecticut
⌂	GTE:	Irving, Texas
⌂	Texas Instruments	Plano, Texas
⌂	Naval Post Graduate School	Monterey, California
⌂	Merced County	Merced: California
⌂	City of Phoenix	Phoenix, Arizona

Benchmark Project Team

Our benchmark team consisted of the following individuals:

- *Mr. Mike Yoemans*, Assistant for Business Process Improvement Program. Mr. Yoemans organized the benchmark project and led the interview process.
- *Dr. Kay Patel*, Research Analyst reporting to Mr. Yoemans. Dr. Patel designed the benchmark program, selected and pre-qualified the benchmark partners, and conducted some of the interview sessions.
- *Ms. Roxy A. Davis,* Consultant, Corporate Resource Associates, Inc. Ms. Davis developed and produced the materials used in the benchmark process; and Ms. Betsy Schmidt of SRA edited the report.
- *Mr. Robert Davis,* Consultant, Corporate Resource Associates, Inc. Mr. Davis participated in the benchmark interviews and assisted Mr. Yoemans in writing the benchmark report.

Team Process

The team used three primary technical references to design the benchmark program. Any or all of these books can be used as authorities for designing and conducting a benchmark program.

Primary Benchmarking References			
AUTHOR	TITLE	DATE	PUBLISHER
Robert Camp	Benchmarking: The Search for Industry Best Practices That Lead to Superior Performance	1989	ASQC Quality Press
Gregory, H. Watson	Benchmarking Workbook	1992	Productivity Press
Michael J. Spendolini	The Benchmarking Book	1992	AMACON

Camp's book was especially valuable for designing the overall benchmarking program because it was based on the pioneering work by Xerox. Watson's book provided excellent examples of forms that can be used for benchmarking. Spendolini provided the best guideline for producing a benchmark report.

The team used the following process for performing the benchmark process:

Step 1. Mr. Yoemans organized the benchmark program and established the objectives, budgets, schedules, and personnel assignments for conducting the project. Mr. Yoemans identified the subject areas that would be investigated with each benchmark partner.

Step 2. Based on her research and experience, Dr. Patel identified, contacted, and qualified candidate organizations for the benchmark program. She then identified the individuals in these organizations who are responsible for process improvement or business process reengineering. She briefed the responsible individuals by phone and by mail on the purpose for the benchmark study.

Step 3. Dr. Patel, working with Mr. Davis, developed the outline for the benchmark interview process. Mr. Davis developed the final materials, which were edited and produced by Ms. Davis.

Step 4 Dr. Patel and Ms. Davis contacted the benchmark partners, briefed them on the interview process, sent them a pre-interview package consisting of the draft F/MPI Guidebook, interview worksheet, and other materials related to the BPIP program. They then made all logistical arrangements and followed up with each partner to confirm the date, time, and location of each meeting. Ms. Davis then prepared a detailed set of maps and directions for travel, lodging, and meeting location. (Without this level of diligence, the benchmark interview team would have wasted considerable time and energy moving from appointment to appointment.)

Step 5. Mr. Yoemans, Dr. Patel, and Mr. Davis - working together, in pairs, or alone - conducted the interviews. Presentations were made, questions asked and answered, notes taken, and documents exchanged. By design, the entire benchmark interview process was completed within a ten-day span.

Step 6. Following the interviews, Mr. Davis summarized the results obtained during the interviews and sent a summary along with our thanks to each of the benchmark partners. The summary was based on perceptions rather than an analysis of the notes taken and materials collected during the interview process. This was done within a few days of the interviews.

Step 7. Mr. Davis then reviewed the notes and materials and worked with Mr. Yoemans to produced this detailed benchmark report. The report was reviewed for errors and omission and produced for distribution.

Our experience indicates that benchmark programs organized similar to this one require approximately 25 person-hours per benchmark partner in addition to travel time and expenses associated with remote-site interviews.

Project Calendar

During the months of May and June of 1993, we established the general requirements of the program, and conducted initial research to identify and qualify benchmark partners. We made contact and exchanged letters of introduction.

Beginning August 1, we designed the detailed program, developed our materials, and made all logistical arrangements including mailing out pre-interview packets. We conducted the interviews during the period from August 16 through August 31, 1993. On September 1, 1993, we wrote the preliminary summary and mailed a copy to each benchmark partner.

On September 15, we began analyzing our notes and the materials we had collected during the site visits in preparation for developing our final report. (We did not work on the project from September 1 to September 15 due to schedule conflicts.) After three drafts were written and reviewed, we wrote the final report and published it on November 4, 1993.

Our experience shows that a benchmark program organized similar to ours requires approximately three to four calendar months to complete. Much of this time is consumed with administrative activities, exchanging letters and materials, and clearing calendars for meetings. We noted that some organizations, such as Xerox and Federal Express, have established permanent benchmark departments due to their extensive benchmarking activity.

Subjects Benchmarked

The benchmark team investigated the following subjects related to the MF/PI with respect to the methodology in place in each partner's organization. The subject areas are presented in the form of questions, because that was the means of obtaining information during the literature search, interview process, and analysis phase of the project.

- What are the guiding principles for process improvement and how are these reflected in the process improvement program?

- Does the organization subscribe to the general philosophies of well-known authorities such as Deming, Joseph Juran, Michael Hammer, Taguchi, or others and to what effect?

- What is the relationship of the process improvement program to quality management programs such as Total Quality Management (TQM) or Total Quality Leadership (TQL)?

- Is the process improvement program being used to support efforts to achieve ISO 9000 certification, compete for the Baldrige Award, or the Deming Prize, or achieve an internal quality award?

- What weight does the improvement program give to change management and cultural issues related to process improvement?

- What organizational elements are associated with process improvement:

  - √ Leadership and management
  - √ Quality department
  - √ Functional elements
  - √ Process improvement office or department
  - √ External facilitators and consultants
  - √ Training organizations?

- How are improvement efforts funded and how are improvement results measured

  - √ What is the cost and length of a typical improvement project
  - √ What is the size of a typical project
  - √ What metrics and measures are used
  - √ Are improvement projects conducted on a fee-for-service basis, or are they funded from a central source?

- What weight does the process improvement program give to the following elements:

  - √ Downsizing or restructuring
  - √ Streamlining
  - √ Cost savings or avoidance
  - √ Cycle time reduction and productivity
  - √ Customer service and products
  - √ Supplier partnerships and acquisition?

- Does the organization recognize the need for a formal methodology to guide improvement efforts

  - √ If not, how do they ensure that improvement efforts will be successful?

  - √ If so, how does their methodology compare with the F/MPI, and how successful has the methodology been in enabling improvement efforts?

- What phases (and steps) of a typical improvement project does the methodology address

  - √ Strategic planning
  - √ Business or operational planning
  - √ Process analysis and performance gap analysis
  - √ Process design, redesign, or reengineering
  - √ Implementation, deployment, and project management?

- Does the methodology support a standard set of recommended techniques and an automated tool set
  - √ Planning techniques such as Hoshin planning or management by objectives
  - √ Benchmarking and best practice analysis
  - √ Quality Function Deployment and other techniques to determine customer (external and internal) requirements
  - √ Brainstorming, nominal group techniques and groupware
  - √ Activity and data modeling techniques
  - √ IDEF0 and IDEF1X tools
  - √ Activity-based costing and time line analysis
  - √ The seven textbook quality tools (based on work by Taguchi)
  - √ The seven textbook management tools (also Taguchi)
  - √ Economic and functional economic analysis (business case)
- Does the methodology address issues such as functional integration and the use of repositories for activity and data models?
- How does the methodology bridge the gap between standard management practices such as planning and technical practices such as application and data base design and development?

- How do you provide training for participants assigned to improvement teams or process action teams:

  - √ Standard instructor-led (internal or external)
  - √ Media-based training and self-study
  - √ Distance learning?

- What is your opinion of our draft F/MPI Guidebook

- What lessons have you learned in the conduct of your program so far?

- What advice do you have for the Department of Defense based on your understanding of our program from what we have told you?

Benchmark Partner Profiles

PARTNER A[1]

This organization formed the Performance Services Group (PSG) following a major downsizing of the company. The mission of the PSG, as an internal consulting organization, is to support business units and staffs in pursuit of their top performer vision by providing business process, total quality, and organization improvement services.

The PSG operates on a fee-for-service basis providing the following services:

- Performance Improvement Project Support
- Total Quality Consulting
- Business Process Analysis
- Activity-Based Cost Management
- Performance Measurement
- Employee and Customer Surveys
- Benchmarking
- Organization and Staffing Studies
- Mission/Vision/Goals Consulting
- Insourcing/Outsourcing Analysis
- Suggestion Plan Administration
- Process Action Team (PAT) Administration
- Qualification of External Management Consultants.

Because the PSG operates on a fee-for-service basis, internal customers are free to contract for outside support if they wish. The PSG does not, however, solicit business outside of the company. PSG responds to this challenge by striving to provide value-added services more cost-effectively than external alternatives.

The group is focused on helping its internal customers restructure business processes around corporate goals with an emphasis on management by performance measurement. PSG characterizes this as "pulling" rather than "pushing" its internal customers into process improvement. At present, improvement projects are not directly tied to strategic planning objectives. Due to the newness of the program (two years), process improvement is conducted at the tactical or business plan level.

Success in achieving process improvement goals is recognized with the Chairman's Award, which is based, in part, on the Malcolm Baldrige National Quality Award (MBNQA) criteria. The company expects to win the MBNQA no later than the year 2000.

PSG uses a variety of marketing programs to sell its services. These include distributing newsletters, sponsoring forums with guest speakers, publishing success stories, providing continuous professional training for their staff, and empowering their staff to solve customer problems with a minimum of bureaucratic controls. PSG management is investigating the feasibility of obtaining certification for its professional staff to enhance its competitive position.

The company has subscribed fully to the principles and practices of Total Quality Management, which is integrated into the company's management culture. There is no a separate quality group because quality is the defined responsibility of all managers. Senior managers participate in the Corporate Performance Council chaired by the President of the company.

PSG does not yet have its own structured methodology in place to guide its efforts, but recognizes the importance of developing a program to support its process improvement efforts. Currently, PSG is using a customized commercial methodology to guide its improvement efforts. Of particular concern is the potential for reuse and for leveraging results absent the aid of its own methodology.

Process Action Teams (PATs) are composed of PSG facilitators and consultants, external consultants when indicated, and functional experts. PATs are managed by advisors who represent the stakeholders of the process.

The process is characterized by these steps:

- √ Provide awareness training
- √ Obtain management commitment for the project
- √ Develop a scope of work for the project and select team members
- √ Provide team training
- √ Document process measures and customer requirements
- √ Use benchmarking and outside resources to establish targets
- √ Provide team facilitation for functional PATs
- √ Select and customize techniques and tools appropriate to the process
- √ Ensure that the team process stays on track.

PSG prices its services at an average of $120 per hour and has an internal goal of billing 60% of its employees' time. The remaining time is spent on internal marketing, administrative tasks, and training. PSG's consultants typically work on four to eight projects at a time as facilitators and consultants. Functional managers are responsible for initiating and conducting improvement projects and establish the criteria for success based on business unit objectives. Each improvement project is expected to return from three to ten times the invested cost of the project over the expected life of the improvement effort. A typical improvement project will be completed within a 12 to 18 week span, not including such time-consuming activities as benchmarking or cost analysis.

PSG relies on the following techniques and tools in process improvement projects, although it realizes that it must develop proficiencies in a broader base of tools:

- Benchmarking
- Process Flow Diagrams
- Activity Modeling
- Brainstorming
- Storyboarding
- Activity-Based Costing.

Functional managers are encouraged to develop skills in using standard quality management tools as a routine practice within their own organizations. The company does not use a rigorous method to cost justify projects and rarely develops alternative approaches to implementing improvements. Improvement projects involving significant capital investments are dealt with through the standard annual budgeting process. Because functional managers are accountable for unit performance, it is felt that they will fund process improvement decisions to the extent that the improved process will contribute to unit objectives.

PARTNER B^2

This organization formed a Process Reengineering Group (PRG) four years ago in response to the growing complexity of its business systems. Two years ago, the PRG was made a formal part of the organization. The PRG was formalized to address the problem of having no clear methodology for process improvement and to gain control over a situation that had *five separate consulting firms* involved in trying to help the company improve its business processes.

As an old-line company that once dominated its business sector, there was considerable internal arrogance and resistance to change. Global competition took an increasing share of their market until the point was reached where drastic action was unavoidable. The issue of survival of the company was real and provided motivation to achieve early and significant successes. Resistance to change was effectively shattered following a major downsizing of the company with several thousand jobs lost. Functional managers became involved in the program and now drive it with the aid of an effective improvement methodology. Most employees in the company now have a clear sense of what is going on and their role in strengthening the company's competitive situation. The manager characterized their present status as having some things starting to go their way. He is focused more on reengineering processes than streamlining them because the processes are "so broken."

The company has accepted the Michael Hammer reengineering philosophy concept, but tempered it with the teachings of Deming, Taguchi, and others. The Malcolm Baldrige and ISO 9000 assessment criteria are used to guide improvement efforts, but not drive them. The emphasis is on understanding the current condition for a given business process, then focusing on how to improve the value of the output products and services of that process to a defined customer population.

While the company uses some computerized modeling, the emphasis is on employing user-friendly wallcharts and storyboards with functional people to work through the improvement process. Their experience has shown that their functional people do not respond as well to the use of technology-based tools as they do to simple, highly visible devices like post-it notes and storyboards.

The manager of the PRG does not characterize the president of the company as an impassioned leader for radical change. The president believes that reengineering must be done, but expects line managers to supply the passion to get results. The company has established goals to be achieved by 1998 with respect to the program:

- Business sectors will have a strong customer focus
- The company will develop a strategic advantage over its competitors

- Processes will be capable of results within a strategic framework and an operational framework defined by a company-wide process map (process flow diagram wallchart), which includes the company's ten key business processes

- Suppliers will participate in, and contribute to, process redesign as defined in key results areas and specific supplier actions

- The company will develop an active learning culture

- Information systems development will be authorized only for improved or reengineered processes.

Up until this year, the efforts of the PRG have been supported by budgeted funding. Now that the concept of reengineering has been somewhat institutionalized, the PRG will shift to a fee-for-service arrangement with its internal customers. The functional elements are responsible for improvement projects with the support of the PRG as appropriate. Functional people do 90% of the work, and the person running the project is the process owner.

Projects are initiated based on a perceived need by a process owner. The PRG helps process owners recognize potential needs by providing awareness training and keeping watch for programs or processes that may be in trouble. The need for an improvement project is also indicated whenever a strategic decision has potential impacts on an operational area of the business. To gain credibility as an internal consulting organization, the PRG was shifted from the information management area to the mainline business area to establish a peer-to-peer relationship with business unit leaders.

PRG follows a written methodology, which was developed in partnership with a major technology company. PRG's version of this methodology differs from the one the technology company markets. PRG's version is tied more to company strategy and business planning and has a much stronger emphasis on the change management aspects of process reengineering, which PRG feels are critical to success. PRG feels that the commercial version of the methodology is more appropriate for use at the division level of an organization rather than as a company-wide methodology.

PRG uses the "Case-for-Action" concept in the methodology to justify improvement projects. The Case-for-Action concept focuses on the contribution of

improvement projects to business unit objectives (macro-level measurements) rather than the specific return on investment in an improvement project (micro-level measurements). The concept behind the Case-for-Action is that *improvement program costs are trivial compared to potential benefits of a successful improvement effort, and the cost to calculate the potential return on investment in any meaningful way could easily exceed the cost of the improvement project itself.* It is important to note that the costs of improvement projects under this concept do not include major capital investments such as machines, facilities, or information systems required to implement the improved process. Such requirements are handled through the normal capital investment budget process and are based on business requirements.

The techniques and tools most used in PRG include:

- Benchmarking
- Activity and data modeling
- Process flow diagrams
- Brainstorming and storyboarding
- Seven standard quality tools for data capture and analysis
- Activity-based costing (but not formal or extensive)
- Economic analysis for significant investment requirements.

An important element of the company's concept of process improvement is the establishment of "decision rights" associated with the change management factors of process management. Six categories of decision rights are established and assigned to work teams as appropriate. As decision rights are assigned to improved processes, the organization is restructured so that it can support these decision rights. Restructuring takes into account management practices, rules and regulations, recognition and reward systems, and other cultural and organizational factors.

The driving force for process improvement is the "voice of the customer." This *voice* is "heard" at four levels:

- Voice of the market - What is happening in a market segment that impacts a defined customer base?

- Voice of technology - What technology developments must we respond to or initiate in order to serve our customers?

- Voice of a customer segment - What interests a group of customers in a class of product offering with respect to our competition?

- Voice of an individual customer - Using sophisticated systems and data bases, how can we best serve a customer on an individual basis?

The PRG staff is composed of volunteers drawn from the functional community. About a third are business systems analysts, a third industrial engineering experts, and a third human resource professionals. Assignment to the PRG is considered to be career enhancing. Based on a variety of factors, PRG staff members may remain in the group moving from project to project, while others may move into the business unit community to help run the processes they helped improve. Some staff members are on sabbatical or temporary assignment and return to their previous assignment at the conclusion of one or more projects.

Some lessons learned in the PRG include the following:

- √ You can't do enough training and education
- √ Full-time teams should work in tandem with part-time experts
- √ The program must be accomplished in-house, avoid over reliance on outside consultants
- √ The client must own the process and must fund at least 50% of the effort, provide strong sponsorship and clear direction
- √ Document as you go along
- √ Bring IM professionals into the process only after macro process redesign, and only as business systems analysts with no technical biases
- √ Keep the IM technical staff out of the process improvement business
- √ Don't overemphasize documenting the existing process: move quickly to improvement analysis and process redesign

- √ Don't look for continuous improvement factors during process redesign: continuous improvement actions should follow implementation of the redesigned process
- √ Simplify processes to the point of rebellion: don't improve an activity or sub-process when you can eliminate it
- √ Benchmark and involve external customers and suppliers in process redesign
- √ Get process owners and sponsors excited about change management so that the redesigned process can actually be implemented correctly

Partner C[3]

This organization has a well-established process improvement program in place which is credited with cost savings of *several hundreds of millions of dollars*. The program is successful because it is driven by functional management with the unconditional backing of senior leadership extending to the chairman of the board. The guiding principles of the improvement program are trust, commitment, knowledge, truth, innovation, and leadership - all in the pursuit of the corporate vision.

The philosophy of Dr. Michael Hammer is embedded in the practices of this organization's efforts at process improvement. Hammer's statement is contained within the methodology developed by this organization. "Reengineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvement in critical measures of performance (cost, quality, capital, service, and speed.") The chairman of the corporation adds this thought: "We are about one year into a lifetime of it."

This organization also believes that, thanks to education and information technology, there are two things the specialized, hierarchical model doesn't effectively leverage:

- ⊠ Today's workers are capable of handling a multitude of tasks without a huge bureaucracy to support them.
- ⊠ Once empowered to act, today's workers are able to produce higher quality goods and services faster and cheaper than before.

This organization has a written methodology in place that drives all process improvement efforts and consists of the following phases:

- *Project selection*: Build a compelling business case. Gain executive sponsorship and resources
- *Project planning:* Define and establish the scope, mission, and objectives of the project, then plan the work
- *Environment scan*: Identify the primary internal and external conditions that affect the enterprise, explore possibilities and opportunities
- *Pre-redesign*: Synthesize the learning, create design principles
- *Redesign*: Create the future business model, identify gaps
- *Implementation*: Plan the implementation details and execute the plan.

Projects are selected for reengineering based on the need to respond to an urgent situation, or to capitalize on a window of opportunity. Factors such as customer service breakthroughs, dramatic cost reductions, and competitive advantage figure in the selection process. Projects compete for selection based on the potential return on effort and investment.

Project planning takes into account project scope and potential cross-functional integration factors. During project planning, the objectives of the effort are established and firm sponsorship is obtained. Project teams are formed based on process expertise and project team members are unconditionally assigned to the project on a full-time basis with no interruptions accepted. This rule is non-negotiable.

The environmental scan looks at the process under study from the customer service perspective. The internal scan is analogous to an AS-IS analysis. The external scan uses various techniques including survey, focus groups, benchmarking, data collection and analysis to gain insights on what the process should be doing in customer service terms.

The pre-redesign phase is really a performance gap analysis with an emphasis on data analysis rather than subjective reasoning. Brainstorming and other such techniques are used only after a firm objective understanding is achieved. As part of

this phase, the team develops six to eight design principles (fundamental assumptions) that will guide process redesign. Each design principle is accompanied by a rationale and a list of implications. This effort provides a focus for designing the TO-BE condition in the next phase and helps ensure that the redesign effort will remain within the scope of the improvement effort.

The redesign phase produces the TO-BE models and quantifies improvement options in terms of customer service, cost, quality, and cycle times. All improvement initiatives are validated against mission and established critical success factors. At this time, the information technology framework is developed that will support the intended improvements. Most of the features of this step are incorporated in our concept of the Functional Economic Analysis. The redesign phase concludes with the development of the Human Resource Framework. This step ensures that the organizational, cultural, and personnel issues related to the proposed improvement action are factored into the implementation phase.

The implementation phase consists of four major components:

- Transition Plans
- Implementation Plans
- Pilot or Prototype Development Plan
- Expanded Implementation/Deployment Plan.

The implementation phase is conducted by selected members of the reengineering team and often results in a promotion or other reward or recognition action for successful team members.

Some of the lessons learned from this methodology are:

- √ Leadership and commitment are non-negotionable requisites for all reengineering projects
- √ Human Resource Planning is a key component of all reengineering projects
- √ Improvement teams must be staffed with the best and the brightest and their participation must be unencumbered by other duties

- √ Improvement projects must emphasize customer service factors as well as cost and cycle-time factors

- √ A pre-redesign step provides a needed interlude between AS-IS analysis and TO-BE design. This interlude gives the team a few days to reflect on the situation, call in functional or technical experts, collect needed data, and apply creative thinking principles to the situation before resuming formal process redesign

This organization's methodology is summed up by the following statement:

The methodology offers a vision of the ideal project, an effort to capture the learning so far, an attempt to apply analysis and rigor to a highly intuitive process, a reinforcement of important principles, and an opportunity to document a phenomenon that is leading to fundamental changes in the way we think about and carry out our business.

The implementation phase of the methodology is considered to be the most challenging phase of the project. The methodology book states:

While the project team may complete its initial redesign in just a few months, implementation is an excruciating and complex change effort requiring strong, committed executive leadership. Implementation requires an environment of customer focus, of trust, of empowerment, of synergy, of breaking the unwritten 'rules' of corporate life to pursue a vision of monumental performance improvement. This kind of cultural transformation doesn't bubble up; it cascades down from the leadership of the organization and to every individual in it.

Partner D[4]

This public sector organization provides services for a medium size city. Its goal is to develop a transferrable process improvement approach and implement process improvements that will have a measurable impact on the quality of services as defined by the following measures:

- Customer satisfaction
- Reduced cycle Time
- Employee satisfaction

- Reduced unit cost
- Reduced error rate.

The Auditing Department acts as the change agent for process improvement in this governmental unit, but a fundamental principle is that operating departments own the improvement project. A Quality Board, composed of government employees and citizens, tracks improvement project progress and advise on the feasibility of transferring elements of the improved process to other departments.

Project selection is an important facet of the program because the city is limited in the amount of resources that can be dedicated to process improvement. Projects are selected using the following criteria:

- Potential for success
- Existence of best practice standards
- Ability to measure results
- Level of visibility
- Level of commitment
- Stability of the process.

The city uses an assessment instrument to evaluate candidates for improvement action. The assessment instrument rates readiness using the above criteria.

Project teams are selected based on the following criteria. Team members must:

- Be a stakeholder in the process
- Possess analytical skills
- Demonstrate leadership qualities
- Be flexible
- Be a champion of quality.

Project team members receive a written charter that delineates their decision-making authority, scope of effort, access to information, and expected results. One important restriction of improvement actions is that improvement must not result in loss of employment.

The improvement methodology is contained within a 200-page manual called *The Enterprise Engineering Methodology*. The manual functions as a guide to making improvement efforts, as a project management plan, and as a tutorial in business planning and process improvement concepts. The methodology does not appear to be based on rigorous techniques and tools, but rather consensus-building activities organized around the concept of Key Results Areas. The primary technique used in this methodology is transaction analysis related to critical success factors. It seems more oriented to standard business planning techniques and continuous improvement actions than to dramatic reengineering efforts. This is in line with the management practice of avoiding improvement efforts that require cross-functional integration or large investments in information systems redevelopment.

The methodology is defined by seven phases:

- Preparation (organization and team selection)
- Define the current situation (objective and subjective)
- Develop a target for the future (vision, goals, critical success factors)
- Understand the trends affecting the organization
- Understand the constraints faced by the organization
- Define work (project plan)
- Evaluate results and reiterate the process.

In summary, the methodology attempts to apply process improvement principles in a hierarchical management structure organized around function rather than process. This necessarily limits the scope of improvement actions to those that can be achieved in small incremental steps through consensus management, rather than the breakthrough improvements sought after in process redesign and reengineering.

Partner E[5]

This organization is focused on business process reengineering and has as its goal to "Attain competitive advantage through differentiation on the basis of customer-perceived value." The elements of differentiation include customer loyalty, premium quality, rapid response, and cost competitiveness. To achieve this goal, the organization believes that it must set *outrageous* reengineering targets for each project:

- 50% reduction in process costs
- 50% increase in revenues per customer contact
- 50% reduction in cycle times
- 70% reduction in time to market for products and services
- 100% improvement in first-time yield (reduced scrap/rework).

Process improvement or reengineering has the support of the Chief Executive Officer and is managed through the Office of the President. Senior leaders ensure cross-functional coordination, integration, and implementation through their participation in the Operations and Marketing Committee. Functional leadership is established for each improvement project and is generally a vice-presidential responsibility with the support of "Process Captains." The Reengineering Planning Director ensures successful team performance.

The *vision* that drives the program is expressed as follows: Our company will be synonymous with quality. We will be recognized by:

- Our Customers as the leading provider of value-added services
- Our Employees as a workplace that encourages positive attitudes, camaraderie, teamwork, creativity, and communication
- Our Investors as a leader of the industry
- Our Communities as a responsible, contributing corporate citizen.

The process improvement program was established in January of 1992 and is led by the Director for Reengineering Planning with a six- to eight-person staff. The Director reports to the Office of the President. The group functions as planners, facilitators, and internal consultants. They provide methodology, funding, orientation, training, and implementation support services. The methodology does not exist as a separate formal document, but is embedded in the requirements for each phase of a reengineering project. Techniques and tools are not emphasized in this program, which is largely driven by observation, data analysis, benchmarking, and management analysis. Process modeling is performed using process flow diagrams rather than activity and data modeling. Activity-based costing is not practiced.

Process management consists of two basic components: process reengineering and process improvement. Process reengineering is considered to be:

- Intensive
- Revolutionary
- Top-down
- About process and system solutions
- Concerned with dramatic improvement.

According to this company, reengineering is an intensive customer-focused, top-down management effort to establish "breakthroughs" in the performance capabilities (platforms) of inter-functional processes.

A *platform* is that unique set of workforce skill sets, technological enablers, and desired performance attributes that, when combined, produce a capability of substantial value to the customer, thus creating a sustainable competitive advantage.

Process improvement is considered to be:

- On-going
- Evolutionary
- Bottom up
- About people solutions
- Concerned with incremental changes.

When the time element is added to these definitions, the company views performance improvement according to this matrix:

Four Fundamental Performance Improvement Approaches		Pace of Change	
		IMMEDIATE	EXTENDED
Degree of Change	TACTICAL	Continuous Improvement	Managed Reform
	STRATEGIC	Organizational Restructuring	Process Reengineering

The methodology for process management consists of six phases. Detailed tasks are established for each phase.

- *Project Organization*: Form reengineering core team
- *Direct Observation*: Review existing processes through direct observation, with front-line input to identify near-term opportunities
- *Form Inter-Functional Teams*: Develop action plans and capture "quick hit" improvements
- *Benchmark and Best Practice Analysis*: Benchmark technology and systems capabilities, assess organizational capability, and reengineer processes to achieve breakthrough objectives
- *Pilot Testing*: Develop pilot programs and test the reengineered solution with prototypes that capture front-line input
- *Deployment*: Deploy tested solutions on a broad basis

This organization has established these success factors and lessons learned with respect to process reengineering:

- √ Identify and define a compelling Case-for-Action
- √ Find a committed champion
- √ Move forward quickly
- √ Don't seek blame for existing conditions
- √ Don't assume any pre-determined solutions
- √ Create "outside-the-box" thinking concepts
- √ Benchmark outside the industry
- √ Understand the root causes of process problems
- √ Drive the program with a sense of urgency
- √ Engage outside resources to ensure objectivity.

Outside resources are evaluated based on the following criteria:

- ⊠ Demonstrated success of past efforts and innovative solutions
- ⊠ Knowledge of the business, markets, and technologies
- ⊠ Interpersonal skills
- ⊠ Cost effectiveness and competitiveness
- ⊠ Responsiveness and adaptability.

Partner F[6]

This public organization applied process reengineering techniques to a public assistance program managed at the county level. This effort redesigned what had previously been a labor-intensive, paper-driven mainframe application into an effective, efficient business process based on an expert system concept and implemented on a personal computer network. The reengineered process delivered the following benefits:

- ⊠ Off-loaded 70% of process costs and resource requirements from an overloaded mainframe system to a network of personal computer workstations removing a serious performance bottleneck

- ⊠ Reduced workstation and other technology costs by 60%

- Strengthened the ability to serve approximately double the number of clients with 28% fewer staff

- Elimination of 400 of 750 pre-printed forms.

The reengineering effort was accomplished in the absence of a formal process reengineering program, largely through the efforts of a single person who responded to a county emergency. The situation was expressed, as follows, by the County Supervisor:

> **My own county would have been bankrupted by escalating welfare costs during the last four years of recession, if we had not undertaken the risk of changing the welfare delivery system and implementing automation....The system utilizes artificial intelligence and PC workstations to manage and apply over 7,000 rules to enable eligibility determination, benefit computation, and case management services...This expert welfare system enabled us to reduce staffing by 28% while caseloads were skyrocketing. Eligibility to clients was improved from 30/40 days to less than four days. Workers have a tool that allows them to meet their workload responsibilities in a more efficient, effective manner and to focus on families -- not the rules and forms. Worker turnover decreased from an annual average over 30% to only 8% this fiscal year. Training time for workers has been reduced from four/six months to four/six weeks.**

She concludes her statement by saying:

> **All levels of government will continue to be challenged to do more with fewer resources. With the right business plan, the benefits of technology, and the federal government as a pro-active partner, we'll be able to build unlimited success.**

The county engaged a major consulting firm as prime contractor for the project and systems integrator. A major information technology company participated as sub-contractor. County personnel provided process expertise, design and development services, and virtually all of the change management work.

Six principles emerged from this reengineering effort:

1. Reinvent/rethink delivery of services

2. Reengineer/redesign the business model

3. Match a technical solution to the business solution

4. Empower workers and establish quality programs

5. Develop a commitment to continuous process innovation

6 Be prepared to begin the whole cycle over at the first hint service delivery systems have become ineffective.

This organization focuses extensively on the *change management* aspects of process reengineering. The leader of the welfare project stated:

> **Reducing resistance requires strong administrative support for change, commitment to rewarding risk takers in the process, and oversight, follow-through, and involvement at the highest levels of the organization. Concurrence, buy-in, and participation at the lowest levels of the organization are mandatory.**

A second emphasis was in the creative use of technology as the enablers for the reengineered process. Some of the technologies utilized were:

- CD-ROM for regulation and policy documents
- Imaging for signatures, photos, and visual information
- Automated call processing
- Bar coding to tag documents
- Word processing with mail merge documents
- Expert systems for rule-based decision making

- Multi-purpose workstation for expert systems, office automation, and access to mainframe data, and application services
- CASE tools for systems maintenance support
- Electronic Funds Transfer (EFT) for benefit delivery
- Optic cards for storage of client information
- Touch-screen for interactive application services.

The lessons learned from this county's experience with process innovation include:

- √ Develop a system of measurements to guide improvement efforts
- √ Change management is a vital component of reengineering
- √ Do not let technology drive reengineering
- √ Must have employee buy-in for success
- √ Employees must be rewarded for participation in reengineering
- √ Supervisors should train their own workers in the new process
- √ Don't rely on outside support
- √ Workers design the new system, not just bosses
- √ There must be a definite break between the old system and the newly redesigned process including training and revised job requirements.

Partner G[7]

This organization is a Malcolm Baldrige National Quality Award recipient. Of all of our benchmark partners, this company has the most formal process reengineering methodology, a version of which is sold commercially along with training and consultative services. The process reengineering concept is firmly established in the management culture of this organization as evidenced by the vision, values, and goals statement that is displayed, and practiced throughout the organization.

Vision:	Customer satisfaction through total quality
Values:	Ethics and Integrity Respect for People
Goals:	Six sigma quality by 1995 Two times theoretical cycle time by 1995
Enablers:	Teamwork Empowerment Training
Standard:	Baldrige criteria

When asked about the popular perception captured in books and articles that quality improvement in general and TQM programs in particular have failed in most companies, the company responded as follows:

> **We strongly disagree. One needs to look very carefully at these articles to determine exactly what is alleged to have failed. In many cases, a failure appears to have been some packaged approach labeled TQM that has been forced into place without regard to company objectives and cultural issues. In others, total quality has not been given enough time to have an effect. After all, there is no single definition of TQM, and that is as it should be. The failure may be in poor implementation, poor execution, or poor advice, not in any fault of the basic principles of total quality as defined by the Baldrige criteria.**

This company's journey to the Baldrige began in 1981, with only minor successes for the first ten years of the program. Since 1991, the rate of improvement in company processes has been dramatically increasing. Process improvement efforts are under the direction of the Chief Information Officer in this technology industry company.

The focus for process improvement and reengineering is on the process which is defined as a sequence of activities that achieve a business result that is:

- Ongoing, continuous
- Not based on existing organizational structures
- Often unnamed and unrecognized for what it is

- Customer-centered
- The focus for all internal activity and investment.

Processes are improved by:

- Fundamental analysis and radical redesign
- Eliminating non-value activities
- Rearranging activities
- Challenging prior assumptions and rules
- Focusing on performance rather than structure.

The company has availed itself of the counsel of all recognized experts including Deming, Juran, Crosby, and others, but credits Hammer with providing the "wake-up" call that accelerated process improvement progress. At present, 75% of the process improvement actions are classified as radical redesign or reengineering.

Process improvement efforts are funded by the functional sponsor of the improvement project and supported by the Center of Excellence (process improvement organization).

The company developed its own well-documented methodology which consists of four phases that share a common thread, called Change Management. This means that the company looks at the change management issues in every phase of the reengineering project rather than waiting until the implementation phase to address these critical issues. In the early phases, a change management strategy is formulated that is progressively developed into an implementation plan by the final phase of the project.

The four phases are:

- *Project Initiation*: This phase addresses a process related problem or opportunity and builds a Case-for-Action under the sponsorship of a functional proponent, which results in a statement of project objectives, scope of effort, and statement of resource requirements.

- *Process Understanding*: This phase develops an understanding of the AS-IS environment through modeling to determine value-added activities and the performance of the process with respect to business objectives and customer needs. The phase concludes with a decision to proceed with process

improvement through reengineering or continuous process improvement actions.

- *New Process Design*: This phase (reengineering only) redesigns the business process, which includes the elements of policy, organization structure, management structure, technology, and facilities.

- *Business Transition*: This phase implements the reengineered process as a prototype, pilot, or deployed business system as required.

The methodology is supported by an extensive documentation and training support package. A library of techniques and tools is included under the methodology framework. The methodology is revised and refined based on project experience.

The investment in process reengineering has returned hundreds of millions of dollars in savings over the last two years in addition to substantial reductions in cycle-time performance and improvements in customer service as measured by surveys.

Information systems engineering is coordinated with process reengineering at several major milestones in the reengineering methodology. The information systems strategy is synchronized with the business systems strategy at project initiation (phase 1). New process design (phase 3) is synchronized with information systems analysis and design. New information systems deployment is synchronized with business transition (phase 4).

The techniques employed in the methodology include:

- Strength/Weakness/Opportunity/Threat (SWOT) analysis
- Strategic analysis
- Project management
- Benchmarking
- Process modeling
- Best practices analysis
- Cycle-time analysis
- Quality Function Deployment (QFD)
- Activity-based costing
- Brainstorming/creative thinking
- Gap analysis
- Joint application development

- Simulation
- Prototyping
- Economic analysis
- Business case development.

Some of the lessons learned in this company related to process improvement:

- √ Set aggressive stretch goals for process innovation
- √ Change the organizational paradigm to customer-centered continuous process improvement
- √ Train everyone! Training is an investment. Senior managers receive more training than others
- √ Communicate, communicate, communicate
- √ Dispel the notion that this is just another program.

Partner H[8]

This organization began its formal reengineering program in 1990, with the objective of radically rethinking the way business is performed in the company. Initial goals included achieving productivity gains of from 20% to 60%, reducing unit costs by as much as 35%, and embedding a quality concept in all business operations.

This old-line company realized that over a hundred years of business had encrusted it with bureaucracy and a tendency to center all decision making authority at the top of the management pyramid. The company saw itself as internally focused rather than customer centered. Employees were rule-based rather than empowered to make meaningful decisions in their area of responsibility.

Reengineering, with an emphasis on technology deployment, was seen as part of the process to restructure the organization into a more responsive company. This technology focus quickly expanded in concept as the organization realized that technology was an enabler, not a solution. This change occurred when the organization realized that most of the problems were cross-functional and would require a team-based approach to solve. However, the teams, as chartered, focus on

functional problems as an adjunct to technology-based reengineering, rather than on the business process as an entity.

This organization defines reengineering as radically rethinking of business process at a series of levels called *workflows*. Changing workflows involves cultural change, which must be addressed on a company-wide basis. Reengineering means looking at the company as an organization, a business, and a creator of products and services based on customer defined requirements.

Workflow analysis involves searching out non-value activities and compressing cycle time by reducing the number of "hand-offs" and with the use of technology solutions. Source data entry analysis is a key component of workflow analysis as is the migration of application systems from mainframes to interconnected workstations running in client-server mode. Much of the analysis work is still focused on information systems rather than the underlying processes, so most of the techniques employed are centered around computer tools such as image-based systems, expert systems, databases, transaction processing, Graphical User Interfaces, voice response, etc.

While numerous tools are mentioned in the company's literature, none include the techniques and tools (activity modeling, activity-based costing, quality tools, etc.) associated with reengineering as defined by our other benchmark partners or by DoD.

This is understandable given that reengineering is located in the information systems organization and the company prides itself on not using outside consultants to aid in its efforts. A quote from a company presentation says that "We have **underestimated** (their emphasis) the impact of reengineering and workflow and now must demand a whole new set of standards, creating a new vision." Clearly, this organization is working on reengineering in a bottom-up mode rather than from a top-down leadership perspective.

This organization's view of reengineering may be characterized in the following quote from a published presentation: "Perhaps, the buzzwords of the day, reengineering, total quality, and all the others, are just **masks** (their emphasis) to what is really going on, plain, old, basic, **common sense** leadership and teamwork toward common goals." This is an interesting perspective when contrasted with the views of most of our other benchmark partners.

Partner I[9]

This high-technology organization has established the largest process reengineering support group (RSG) of any of our benchmark partners. It constitutes a division of 75 professionals.

The group includes:

- Expert and knowledge-based systems developers
- Human factors analysts
- Business process engineers
- Operations researchers
- Systems requirements specialists
- Project managers
- Process simulation specialists
- Conceptual model developers
- Application and systems programmers.

In contrast to most of our benchmark partners, business process reengineering is performed by the RSG with the cooperation of internal customers rather than being driven by the functional users themselves, as is the case with most of our partners. This company feels that this centralized approach helps ensure that reengineered processes will be more supportive of company strategy.

Processes are reengineered by challenging all assumptions about current business processes and then designing new processes based on the company's strategic objectives. Process action teams start with a "clean slate" and design the new process as if the company did not exist. Only then are the redesigned processes adjusted to the real world of the existing organization. Technology is definitely a driver in this organization's view of reengineering. Expert and knowledge-based systems solutions are considered as part of all reengineering projects, but only as a secondary consideration to the business purpose of the process.

With the extensive resources of the RSG, new designs are subjected to simulation by building dynamic models of the reengineered process. Simulation techniques are used to develop cost/value data to help prove or disprove the assumptions used in process design. Cost/value data are also used as a filter to prioritize the implementation of reengineered processes based on return on process improvement investment (ROP).

Reengineering in this organization is heavily data dependent, and various techniques are used to collect and analyze relevant data as the basis for improvement initiatives. Statistical techniques are used along with computer simulations to test assumptions and design principles. Simulation techniques and operations research (OR) techniques are used to support functional integration efforts as well as systems integration efforts. Field process trials are often used to validate reengineered processes by including the human and organizational elements of business processes, something simulation does not readily account for.

Information systems development and redevelopment in support of reengineered processes are subjected to rapid prototyping so that users of the potential systems can evaluate suitability and provide data for improving functionality prior to formal systems development.

Because process reengineering involves substantial economic investments, the company developed a methodology called Process-based Cost/Value Analysis (PCVA) which is an dramatic extension of Activity-Based Costing (ABC). PCVA not only captures the unit costs of the output of an activity (like ABC) but also computes a *value* for that unit of output (which ABC ignores). This produces a ratio of value to costs for each activity in terms of its output, which can be used to evaluate the relative worth (value-added) of the activity. This means that deciding whether an activity is value-added or non-value added can be based on objective, rather than subjective terms, and can be a scaled rather than generating a discrete yes-or-no decision.

PCVA techniques are employed for four classes of business process activities that generate costs and value:

- Core business processes necessary to meet strategic objectives
- Command and control processes
- Information transport (communications) processes
- Quality assurance processes.

The PCVA methodology consists of six steps or phases:

- Identify core activities within the process
- Select measures for core activities
- Identify interdependencies among core activities

- Build a process model that can be subjected to simulation
- Collect data from the four classes of process activities to define parameters for process simulation
- Run the model through a series of simulations using the cost and value parameters to help measure the economic effects of various reengineering possibilities.

The net result of the PCVA methodology is that it identifies the projects that will provide the company with the most added value and the most potential for reducing costs associated with non-value or limited-value activities.

In addition to PCVA and modeling and simulation techniques, the company relies heavily on benchmarking to establish process performance targets and best practices to achieve these targets.

Lessons learned from reengineering projects in this organization include:

- √ Upper-level executives must facilitate the cooperation of operational managers in process improvement efforts by pleading, persuading, rewarding, or threatening as appropriate
- √ Functional users must be reassured that they will not be punished if process improvements fail to produce desired results
- √ Managers can only change what they control, so process reengineering must be managed at an appropriate level and utilize cross-functional teams
- √ Only stable processes should be subjected to process reengineering efforts
- √ Ensure that expectations are firmly established before beginning a process reengineering effort
- √ Process reengineering should be centered on strategic company objectives, directed to securing customer needs, and conducted using analytic methods.

Partner J[10]

This organization began to develop their process improvement program in 1980, and since then developed a comprehensive improvement methodology that they now market to other companies. This organization also has a Malcolm Baldrige National Quality Award-winning division.

The process improvement program in this company is founded on the concept of excellence for total quality. They have established 12 conditions of excellence:

- *Customer orientation*: The primary task of every employee is to satisfy internal and external customer requirements
- *Participation*: All employees participate in the improvement program
- *Development*: People are key strategic resources and are given opportunities to contribute to total quality
- *Motivation*: Rewards and recognition are based on achievement of program objectives
- *Products and Services*: Process outputs are directly related to customer needs
- *Processes and Procedures*: The processes used to produce products and services are monitored through the use of appropriate technology and tools
- *Information*: Information management is integrated with products, services, processes, and procedures
- *Suppliers*: Suppliers are included in the total quality concept
- *Culture*: A value system is established in which individual and team actions contribute to quality goals
- *Planning*: Strategic and business plans recognize quality as a primary business objective
- *Communications*: Interpersonal interactions are clear, consistent, and forceful

- *Accountability*: Measures are established and effectively used.

To achieve results in these 12 areas, the company has established a methodology to radically improve or reengineer business processes. There are six phases in this methodology:

- *Commit to Performance Improvement*: This phase identifies a senior manager as process sponsor, establishes management expectations, and provides initial resources

- *Select and Scope Process:* This phase defines the boundaries for process improvement and selects and trains the process improvement team

- *Analyze Current Process*: This phase establishes the baseline, identifies customer requirements, gathers relevant process cost and cycle-time data, determines performance targets, and identifies process improvement issues

- *Design New Process*: This phase uncovers breakthrough opportunities and designs an innovative process to meet stretch targets

- *Implement New Process:* This phase provides an implementation plan which includes dealing with change management issues

- *Manage Process Performance*: This phase calls for ongoing measurement of process results using statistical data capture and analysis techniques and provides a basis for continuous process improvement

This company has established a standard tool set for use in process improvement actions. Standard techniques and tools focus on metrics and measures so that management of the improvement process can be clear and simple.

The tools in this library support the following techniques:

- Process mapping
- Customer value structure metrics
- Process benchmarking
- Cost-time profiling analysis
- Root cause analysis
- Customer/competitive gap analysis
- Process redesign
- Implementation and change management planning.

The methodology is backed up with a series of training programs, workshops, consulting and facilitation services, and a complete set of documentation. A typical process improvement cycle will require approximately three months through process redesign. The cost of a typical project is comparable to DoD costs.

Like Partner I, this organization has established techniques to measure the value delivered by a process, which can be used with activity costs to develop comparative ratios for process performance. Three parameters are included in this value analysis concept:

- Value-to-Price, which measures customer satisfaction
- Value-to-Cost, which measures financial performance
- Quality costs, which measure the extent of error-free performance

The company has established an extensive list of potential metrics that can be used in value analysis. Unlike Partner I, this company's process included subjective factors in the calculations based on weighting and ranking.

This organization places more weight on the cycle-time metric than most of our other partners, and therefore has developed sophisticated techniques to calculate and control cycle time. The underlying philosophy is that the cost of a process (not including materials) is primarily a function of time. When you reduce the cycle time in an activity or process, you automatically reduce the cost of the activity or process. Because this company's research and experience indicate that only about 10% of process (elapsed) time constitutes value-added work, significant gains can be made by analyzing the time spent in a process rather than the cost of resources. This becomes an argument against the use of activity-based costing as the primary technique to identify and reduce non-value activities.

This organization has also linked cycle time with quality. The theoretical goal is to drive quality factors to 100% while at the same time driving cycle time to zero. Process costs are almost automatically reduced as a consequence.

This organization finds a strong link between total quality management and process reengineering. They use a formula in their awareness training program that says: "Leadership (times) Empowered People (=) Results." They define leadership as establishing the vision and goals of the organization and developing good plans to guide performance efforts. They define empowerment as a culture where employees are dedicated to continuously improving their customer understanding, their personal skills, and the processes of which they are a part.

The lessons learned by this organization include:

- √ Top management must be committed to the program
- √ Attack diseases, not symptoms (root cause analysis)
- √ Processes must be redesigned by those who use them, not outside experts
- √ Patience is required because to effect meaningful change takes time
- √ Recognition of team and individual effort is essential for success
- √ A culture change must take place that has managers converting from directors of effort to enablers and cheerleaders, and employees shifting their primary focus to customer needs.

Partner K[11]

This organization is also a Malcolm Baldrige award winner. Its improvement philosophy is built on the concept of continuous improvement with a commitment to people, service, and profit.

The company has a VP for Quality and a Quality Academy matrixed to the Corporate Quality office. There are over 100 quality professionals in the company who act as trainers and facilitators. The quality organization operates on a fee-for-service basis, and functional managers drive the improvement program.

Training is focused on the use of techniques and tools in the pursuit of quality processes. Employees are trained in measurement, empowerment, leadership, and planning. The tools used include Pareto analysis, cost/benefit analysis, force-field analysis, and other standard quality tools.

Cross-functional teams, used to improve major processes, are required to focus on supplier/customer alignment with process objectives. Pay, rewards, and recognition are linked to quality performance. Planning objectives are linked to performance through the use of metrics. The company sets a target of 100% customer satisfaction as measured by survey. The company rates its current performance at 95% customer satisfaction.

Lessons learned by this organization include:

- √ A focus on planning is important
- √ The strategic plan must be a living document and communicated to all employees
- √ A focus on the improvement of key processes is important
- √ Professionals selected for quality positions should have fast-rising manager potential
- √ A system for improvement program standardization and replication (methodology) should be developed
- √ Business process improvement tools and principles should be taught as a routine matter
- √ Quality and process improvement should not be seen as something separate from the on-going responsibility of employees to be focused on providing services for both internal and external customers
- √ Quality is not tools.

Partner L[12]

This government organization is recognized as a quality leader within the Federal Government. As such, it has a highly developed program to train quality and process improvement team members supported with a well-developed and lucid methodology.

This organization defines quality leadership as:

> **An approach to leading and managing that is guided by a total view of how all systems of work and people blend together to meet mission requirements, and ultimately perform the service for our country. Quality leadership is a bottom-line approach to assess and improve continually the processes by which an organization conducts its business. Lowered operating costs, increased satisfaction on the part of the customer or end user, increased productivity, and improved operational readiness will result as quality improves.**

This organization's view and practice of quality and process improvement are based on the work by W. Edwards Deming. An interesting facet of this program is the integration of quality principles and techniques into a military organization, and the balance of empowerment and team processes with the concept of chain-of-command. This organization views total quality management as a means to strengthen, rather than weaken, the concept of command authority.

The methodology for process improvement consists of 12 steps, each supported by a recommendation of the techniques and tools that can be used in the step. Elements of the methodology are based on the Shewhart Cycle: Plan - Do - Check - Act. The 12 steps are:

- Select a Project — Brainstorming/Multi-voting
- Organize the Team — Team Techniques
- Define the Project — Brainstorming/Multi-voting
- Study the Current Situation — Flowchart/Check Sheet/Pareto /Run Chart

◙ Simplify the Process	☛ Flowchart/Check Sheet/Pareto /Run Chart
◙ Analyze Root Causes	☛ Multi-voting/Cause and Effect Diagrams/Check Sheet/Pareto
◙ Plan the Improvement	☛ Brainstorming/Multi-voting/Flowchart Check Sheet
◙ Do the Test	☛ Check Sheet/Run Chart
◙ Check the Results	☛ Check Sheet/Run Chart
◙ Act on the Results	
◙ Standardize and Monitor	☛ Flowchart/Check Sheet/Run Chart
◙ Take Further Action	☛ (All Tools)

Because this partner's program is more oriented to quality management than to process reengineering, we provide only an abbreviated profile.

Benchmark Program Analysis

As can be seen from the profiles of our benchmark partners, all the results cannot be displayed in a matrix because of the widely varying types of information we gathered from each partner. Each partner has a different view of process improvement in the context of the organization, and approaches it from a different direction based on their corporate experience. This is understandable because process improvement (or reengineering) is a recent phenomenon, still subject to much debate. The term reengineering was coined only a few years ago, and we are still trying to decipher its true meaning

We were able to capture critical success factors and compare them. This is shown in Tables 1 and Tables 2. It is interesting to note that the most aggressive benchmark partners (which included two of the three Baldrige winners) identified more critical success factors than the others.

Notwithstanding, we learned a lot from each of our partners that can be used to change or improve various elements of the process improvement program in DoD. We can also benefit from considering what has worked for these organizations, and by studying the lessons learned, we can discover general truths. Above all, we believe that we have validated the concept of the process improvement program in DoD by comparing our program with that of twelve other organizations that have achieved different degrees of success in their journey to becoming a high-performance organization.

After taking into account the differences between DoD and the public and private sector organizations we consulted with, we can identify common elements that factor into the probable success of process improvement efforts, as well as common barriers that potentially inhibit success. These we list next. In the following section of this report, based on our benchmark experience, we will attempt to draw conclusions and formulate recommendations for improving our program.

It is vital to note that organizations *are* succeeding at reengineering and realizing major cost savings, improved quality, and strengthened customer relationships as a result.

Common elements that appear to contribute to the successful conduct of a process improvement or process reengineering program are shown in Table 1.

Critical Success Factors for Process Improvement/Reengineering
◙ Effective executive leadership
◙ Linking of process improvement objectives to strategic and business plans
◙ Strong customer focus for improvement efforts
◙ Functional elements perform process improvement with the assistance of an internal support group
◙ Minimum reliance on outside consultants and experts except when special skills are needed
◙ Reliance on metrics and measures
◙ Adherence to quality standards like the Baldrige criteria
◙ Use of tools and techniques for process improvement
◙ Existence of a highly skilled and motivated reengineering support group
◙ Strong emphasis on change management, cultural, and implementation issues
◙ A movement toward a team-based workforce with an emphasis on skill development
◙ Information systems reengineering coordinated with process reengineering
◙ Structured methodology to guide improvement programs

Table 1

Table 2 identifies the partners who commented on each success factor. *The absence of a checkmark indicates only that the partner did not overtly mention that success factor when discussing their improvement program.*

CSF Comparison Table	A	B	C	D	E	F	G	H	I	J	K	L
Effective executive leadership	√		√		√	√	√		√	√	√	√
Link process improvement to strategic and business plans		√	√				√		√		√	
Strong customer focus		√	√	√	√	√	√	√	√	√	√	
Functional elements drive improvement teams	√	√	√	√	√		√			√	√	√
Minimum reliance on outside consultants	√	√					√		√	√		
Reliance on metrics/measures	√	√	√		√	√	√	√	√	√	√	√
Adherence to quality standards	√	√		√			√	√		√	√	√
Use tools and techniques	√	√					√		√	√	√	√
Existence of a skilled reengineering support group	√	√			√		√		√	√	√	
Strong emphasis on change management issues	√	√	√		√	√	√			√	√	√
Move toward team-based workgroups		√	√			√	√	√		√	√	
Information systems reengineering coordinated with process reengineering		√				√	√	√	√			
Structured methodology to guide improvement efforts	√	√	√	√	√		√			√		√

Table 2

Common problems or barriers were shared by several benchmark partners:.

- Resistance to change at middle management levels
- Downsizing and employee security issues
- Competitive pressures
- Synchronizing information technology improvements with process improvements
- Shift to process management from functional management
- Calculating the potential return on investment in process improvement efforts
- Knowing how to engineer an optimum solution to the process performance gap determined during process analysis
- Cross-functional integration.

Conclusions and Recommendations

We conclude that there is a direct correlation between the formality of a process improvement program in an organization and the magnitude of the results achieved. All of the organizations we benchmarked with who have won quality awards, such as the Baldrige, and/or who have achieved ISO certification, are organizations that have formalized their improvement program with written methodologies, data-based techniques and tools, continuous training, internal consultative services, expert facilitation, and hands-on support.

These organizations also share three other characteristics: Shift in orientation from functional to process management, senior leadership of process improvement, and a cultural change toward worker empowerment and team-based performance management.

We also noted that successful organizations use external standards, such as the Baldrige criteria, as a basis for conducting their process improvement efforts. This is true whether or not they intend to apply for the award.

We observed that the most successful organizations have integrated their quality program with their reengineering program, albeit in different ways. Quality is becoming a regular management function and is being integrated into these organizations' planning and control systems. Process innovation is becoming more rigorous with the use of data-based techniques borrowed from the quality disciplines. Processes improved through reengineering techniques are subjected to continuous process improvement (TQM) techniques to hold the gains. Workers are empowered to continue the improvement process as a natural part of their assigned responsibilities.

We believe that this change (combining TQM and reengineering programs) is a direct consequence of the failed attempts to implement improved processes without addressing the change management and cultural issues associated with major changes in the way people are asked to perform their jobs. We also believe that many of the failures of total quality management and process reengineering programs as reported in the literature may really be failures to re-set the culture of the organization to accept this new way of managing an enterprise.

A common thread running through all improvement programs is the obsession with identifying both internal and external customers, and then capturing the "voice of the customer" as the driving force behind process innovation. This seems to be a non-negotionable imperative for success. Viewing a process as an end-to-end linkage of value added activities from external suppliers to external customers with many hand-offs between internal suppliers and internal customers is the foundation for process improvement. It is clear that an employee cannot truly function as an internal supplier and customer in a hierarchical rule-based organization. The customer cannot be "king" when the employee's duty first and foremost is to serve the boss or follow a rule. This places a natural limitation on the extent to which processes can be improved in a given organization. Clearly, in a government organization, there are limits to employee empowerment, and that is perfectly acceptable as long as it is also understood that there are then limits to which processes can be improved.

Metrics and measures play a critical role in process improvement in successful organizations. There is a strong link between strategic and business planning and process and organizational performance. We noted that organizations that are just beginning to adapt quality and process improvement programs rely on subjective measures to a much greater extent than companies who have mature programs. The trend seems to be to remove all subjectivity from process improvement efforts through the use of data based techniques supported with automated tools to perform simulation and economic analysis wherever possible. There seems to be an

awareness developing that service based organizations can employ the same type of rigorous techniques, such as statistical methods, as product based companies. Rejects are rejects, whether they occur in a physical product or in a service call.

We found striking similarities between our process improvement program and those of the most successful benchmark partners. With one possible exception, the most successful programs are driven by functional managers with the support of an internal reengineering support group, usually quite small in numbers. The support group provides methodology, techniques, tools, training, workshop facilitation, and consultative support. Outside consultants are used sparingly, only when a specific body of expertise is required, or the nature of the improvement effort requires an objective viewpoint. Improvement programs are funded by the functional areas at least in part. Until an improvement program is firmly established with documented results, the services of the reengineering support group are not billed to the functional area. Once a history of results is achieved, the reengineering support group shifts to a fee-for-service mode of operation.

Cost justification of process improvement programs is an issue with most of our partners. Most of our partners shift the burden of cost justification to functional elements because only they can calculate the true costs and benefits of an improvement program with respect to their business or performance objectives.

We found that most organizations separate capital improvement costs associated with process improvement projects from the labor cost of performing process improvement projects. Capital improvement costs, such as new facilities or information technology systems associated with improved processes, are justified through standard economic analysis techniques. The labor (and associated facilities) costs of performing a process improvement project are dismissed as trivial compared to the expected value added of the improved process. When asked, most of our benchmark partners felt it would cost more to truly calculate the cost/benefit ratio for a process improvement project than the cost of the improvement project itself. We can expect that, as experience is gained and metrics and techniques are developed to calculate such ratios, this will change in the future.

We found that our typical program costs estimate of $50,000 per week over a three-month period was well within the experience of our benchmark partners. We must note that most of our partners did not track this type of information, so we had to be content with their judgment on this issue. Those benchmark partners that sell process improvement services charge rates that are comparable to our program costs.

We feel confident that we are competitive when compared to commercial pricing for process improvement support.

Finally, on the methodology issue, we were pleased to find that our framework methodology for process improvement compared favorably with the methodologies used by the most successful benchmark partners. We gathered considerable data that will help us improve the methodology, especially in the implementation and change management phases.

If anything, our methodology is more detailed than those we benchmarked against, but our partners felt that this was a necessary consequence of the nature and size of DoD. We have far less control over improvement projects than private sector companies and therefore need to document the methodology to a greater extent. It was interesting to note that the one benchmark partner that has a methodology as detailed as ours is, itself, a public entity.

Based on our benchmark experience, we can generally conclude that we are, indeed, on the right track with respect to our process improvement program. We need to address and solve change management, cultural, and organizational issues if we are to achieve the magnitude of success expected of us, and achieved by our most successful benchmark partners. We need to continue to develop and improve our methodology, techniques, tools, and training elements; but this will always be the case. Process improvement is itself a process, and as such, is subject to innovation, reengineering, and continuous improvement like all processes.

It would be a mistake to codify elements of the process improvement program in rules and regulations that are difficult to change and adapt as we gain experience with process improvement and develop new methods and techniques. At this stage of the state of the art, and at our current experience level with process improvement, we should not proceed beyond providing guidance for process improvement.

At present, IDEF techniques appear to be the only aspect of the improvement program that should be subject to standardization and codification. IDEF has been proven with over 20 years of successful use, enjoys widespread support from the vendor community, and has an active user's group that maintains its state-of-the-art status. DoD 8020.1-M, Draft Interim Management Guidance on Functional Process Improvement, should not achieve the status of a regulation or directive at this time.

Next Steps

1 We will continue to analyze and evaluate the information and materials resulting from our benchmark experience and use them to improve elements of our functional process improvement program.

2. We will continue to maintain contact with our benchmark partners and keep the lines of communication open for an exchange of ideas and experiences.

3. We will continue to benchmark our program with other successful organizations, with each benchmark becoming more focused and more definitive as we become more experienced and more knowledgeable.

4. We will continue to work with elements within DoD and other Federal Agencies to share methods, techniques, tools, training materials, and case studies to leverage our attempts at refining and improving our program.

5. We will move more aggressively in supporting the DoD Agencies as we continue to gain confidence that we have a sound and substantial program of process improvement to offer our functional customers.

6. We will continue to apply the methods and techniques of process improvement to our own program in order to maintain our credibility as change agents for process improvement within DoD.

APPENDIX A

Department of Defense Process Improvement Program Profile

Business Process Reengineering[1] in DoD is defined is an integrated methodology applied by functional managers to redesign the Department's processes, organizations, and culture. The redesign can and should be continuous, and can be either radical or incremental, and will likely capitalize on innovative application of technology. Redesign efforts will focus on maximizing customer satisfaction, eliminating non-value added activities, increasing quality and productivity, and reducing cost and cycle time.

The focus of the Corporate Information Management (CIM) Initiative and of Defense Management Review Decisions (DMRDs) has expanded from only an information systems perspective to the analysis and improvement of all DoD functional processes together with their supporting data and information systems. The expanded focus has resulted in the institution of the Functional Process Improvement Program (FPIP), which incorporates Business Process Reengineering principles.

The FPI program is based on several key principles.

- Functional managers shall be held accountable for all benefits and all directly controllable costs of developing and operating improved processes and their associated information systems.
- Existing and proposed processes will be subject to cost/benefit analysis which includes benchmarking against the best public and private sector achievements.
- The functional manager defines process and systems requirements, manages implementation, and measures results. The Information Technology organization is a fee-for-service provider that provides assistance as needed.
- Simplification of processes by elimination and integration is preferred over automation.

[1] Official documents refer to Business Process Reengineering (BPR) as Functional Process Improvement (FPI)

- Simplify functional processes before (re)designing related information systems.
- Require process (activity) models and data models for all functional processes as the basis for information system design and implementation.
- Provide common information systems for identical functions.
- Information systems performing the same functions must be common unless specific analysis determines that they should be unique.
- Common definitions and standards for data shall exist DoD-wide.
- Data must be entered only once at the point of creation (source).

The FPI program recognizes the principle that process improvement is a "do-it-yourself" project. While experts, consultants and facilitators can be used effectively in certain parts of an improvement project, functional managers and their staff must work through the improvement program themselves. Therefore, FPI is designed to be used by functional elements who are not process improvement experts or information systems professionals.

The FPI also recognizes that process improvement is an iterative project with each successive iteration building on previous results. This also means that process improvement is now a "never-ending" part of the functional manager's job description.

Functional managers are both required and empowered to proceed with process improvement within their areas of responsibility. Experience has shown that all functional processes deteriorate over time with respect to efficiency and effectiveness unless they are subject to continuous process improvement (CPI) programs.

Functional managers can take at least three immediate actions that are entirely under their control:

1. Reduce the overhead costs associated with value added activities
2. Eliminate non-value activities, thereby saving the associated costs
3. Consolidate like functions within their functional process.

Improvements that involve information systems modifications or that cross functional or organizational boundaries will require the assistance and support of the Principal Staff Assistant (PSA) for that functional area. Functional managers will still assume a leadership role in improvement projects in these situations.

Process improvement projects are approved based on quantitative analysis and justification supported by a fully documented business case or decision package termed the Functional Economic Analysis (FEA). There are four primary classes of measurements that are used to support proposed improvement projects:

- Cost as expressed in terms of reductions or return on investment
- Time as expressed in terms of cycle time or response time
- Fitness for purpose in terms of satisfying precise customer needs and requirements
- Conformance to standards expressed in terms of waste, rejects, returns, rework and with respect to internal quality standards.

Benchmarking and competitive analysis techniques can be used to establish performance goals in all four categories of quantitative measurements. Best practices techniques can be used to develop specific recommendations for improved processes that will result in achieving performance objectives. Other tools and techniques can be used to identify improvement opportunities and assist in the redesign of functional processes.

Functional managers should understand that process improvement does not necessarily involve or have an impact on automated information systems. But when there is a real or potential impact on information systems, functional managers must ensure that their functional processes have been optimized to the fullest extent possible prior to specifying information system requirements. The guiding principle is that the greatest return on the investment in automation occurs when automation is applied to value-added activities and processes.

The following is a condensed version of the FPI methodology for process improvement, which is carried out by functional managers with assistance of the business process reengineering support staff. The methodology is further described in Appendix B.

1. Validate mission goals, and objectives for the area of responsibility This should include a vision statement and guiding set of principles that are acceptable throughout the organization.

2. Identify all internal and external customers. External customers are defined as the people who benefit from the unit's products and services. Internal customers are defined as the people in the organization who accept outputs from others and add value to them until the product or service reaches an external customer. Once customers are known, their specific needs can be identified along with alternate sources of supply (competitors).

3. Document the baseline functional processes. This involves developing or updating activity and data models describing the current functional processes. Information systems (applications, data, and geo/technical) architectures will need to be reviewed and updated with the support of the technical managers. Once this is accomplished, the functional manager knows what the current situation is and has a basis for developing quantitative improvement initiatives supported by justifiable measurements.

4. Use the specific techniques and tools to identify process-related problems and opportunities that affect the way customer's needs are supported within the constraints of the mission statement. Then develop project initiatives that will resolve the problems and exploit the opportunities. Once this is accomplished, the functional manager has a slate of improvement projects that will potentially improve the overall performance of the organizational unit.

5. Develop alternative approaches to implementing each set of improvement initiatives, looking for the alternative that offers the best economic justification for action with a minimum of risk. Once this is accomplished, develop a specific recommendation with complete cost/benefit data that will address a set of problems and opportunities (initiatives) associated with the functional process.

6. Document all recommendations and plans in the Functional Economic Analysis (FEA) decision package and submit it for review and approval.

7. Once the recommended improvement package is approved, the functional manager executes the implementation or action plan to install the improvements. This step documents the plan of action (task list), shows the timetable for completion, and specifies resource requirements.

8. Following implementation, update baseline data and prepare for the next cycle of improvements.

Several common Critical Success Factors (CSFs) indicate the potential of that organizational unit to optimally accomplish process improvement:

- There is clear and direct leadership support for improvement activities and responsibilities are properly assigned.
- There is a single coherent methodology to drive improvement efforts across the organization.
- There is a clear and consistent vision and values statement, and all members of the organizational unit conduct themselves accordingly.
- The mission of the organizational unit is sharply defined and is compatible with the mission statements of higher authorities. The mission statement is used to develop critical goals that shape the structure and performance of the organizational unit.
- The organizational unit has identified all significant external and internal customers and has an effective program in place to recognize customer needs and requirements that form the basis for developing specific organizational business objectives.
- Processes are designed, redesigned, and continually improved with respect to product and services requirements. Reengineering efforts are focused on areas of highest potential payback.
- Barriers to implementation are defined and resolved, and controls are put into place to preserve the gains produced by process improvement.

- The organizational unit is "right-sized" in terms of its consumption of organizational resources with respect to the value of its output products and services. In other words, the organizational unit adds measurable value to the functional processes it supports.

- Information systems are designed and implemented to support optimized, improved and value-added processes. Corporate Information Management (CIM) principles are followed with respect to automated information systems.

- Decision-making is delegated to the lowest feasible levels in the organizational unit. Where possible, self-managed team concepts are employed. Non-value added activities and unnecessary overhead functions and tasks are reduced or eliminated.

- Training is an ongoing process, and members of the organizational unit are graded in part on skill development as well as task performance.

The FPI program is expected to deliver the following benefits to the Department. All organizational units:

- Will continually support DoD mission objectives (capability, readiness, security) as downsizing and budget reductions continue

- Are responsive to changing as well as static customer requirements, thereby remaining competitive with respect to alternative sources (competitors)

- Will make optimal use of all assigned resources with respect to process requirements while at the same time improving the quality of all products and services

- Will develop a creative, motivated, and flexible work force empowered to act within broad guidelines and rewarded on achievement rather than effort.

The conduct of the FPI program to date has produced the following lessons learned:

- √ Senior managers are finding that process reengineering is easy to define, but hard to implement. Solutions are difficult to engineer.

- ✓ Managerial and technical barriers are similar in both industry and DoD.
- ✓ 80% of the potential improvements do not involve automation.
- ✓ External rules and controls are not a big inhibitor to success.
- ✓ Engineering and implementing new processes and shared technology solutions require major cultural changes.

Certain key strategies have been identified based on our results to date. These strategies, when implemented, will help overcome barriers and insure successful implementation of the FPI program:

- ⊠ Make clear statement of top-level commitment of BPR
- ⊠ Require strategic plans, performance plans, and performance reports
- ⊠ Conduct high-level gap analysis to define high-payback areas
- ⊠ Reward managers who take risks and improve their processes
- ⊠ Define and agree upon critical success factors
- ⊠ Assure senior leaders will buy in and follow through
- ⊠ Develop strategies for dealing with reductions to staff
- ⊠ Develop and implement mechanisms for resolving barriers to success
- ⊠ Put adequate dollars behind the program.

The Functional Process Improvement Program is itself a process and is subject to the same requirements as are all processes in DoD - continuous process improvement using the same methodologies, techniques, and tools that are applied to the Department's other functional processes.

APPENDIX B

Framework for Managing for Process Improvement

The DoD Corporate Information Management (CIM) initiative is the largest information management program ever conceived by any U.S. business organization. The initiative calls for a major reengineering and restructuring of business methods and administrative processes throughout the DoD.[2]

The Functional Process Improvement Program (FPIP) under the ASD (C^3I) is designed to provide the mechanism for effecting this transformation. We have already obtained significant results in the functional areas where FPIP has been applied. But as we gained experience with the program, we realized that we needed an overarching methodology to guide improvement efforts on the massive scale required to achieve results consistent with our current national defense policy.

This line of thinking led to the development of the *Framework for Managing Process Improvement Guidebook* (Framework). The Framework provides a comprehensive methodology for performing process improvement projects and is applicable in all functional areas in the Department. It supports all three levels of improvement efforts that we include under the definition of Functional Process Improvement (FPI).

- *Continuous Process Improvement*, which reduces variation in the quality of our output products and services
- *Process Redesign,* which removes non-value added activities from our processes and improves our cycle-time response capability
- *Process Reengineering,* which radically changes processes to gain dramatic improvements in efficiency, effectiveness, productivity, and quality.

[2] Status of the Department of Defense Corporate Information Management (CIM) Initiative, October 1992, page 3.

The Framework was developed after an intensive period of research into the theory and practice of process improvement. We examined not only the literature related to Functional Process Improvement (FPI), but also material about the practice of Total Quality Management (TQM) and Total Quality Leadership (TQL).

We found that both FPI and TQM are concerned with the same issues and seek to achieve the same objectives, but approach the problem from different perspectives. By taking the best practices and techniques from each discipline, we were able to develop a methodology that we believe represents breakthrough thinking into the problem of applying quality management principles in a service-type organization. Recent literature on process improvement suggests that others are arriving at the conclusions we reached some months ago.

Some of the best practices used to develop and improve the Framework methodology include:

- DoD internal control program
- DoD data administration program
- DoD groupware centers
- OSD Health Affairs contract vehicle
- Defense Information Systems Agency implementation support
- OSD staff integration of BPR activities
- DoD schools and universities
- Academia
- Industry vendors
- IDEF User's Group
- Federally funded R&D centers
- Best commercial practices
- Navy benchmarking
- Air Force ICAM program
- Army reuse encyclopedia.

Any methodology developed to guide improvement efforts must be comprehensive, and must be based on best practices wherever they are found. To confirm our theory, we benchmarked the Framework with 12 private and public sector organizations known to have achieved success in process improvement. Our benchmark partners included three winners of the Malcolm Baldrige National Quality Award and those and others who have achieved ISO 9000 certification.

We found that having a unified methodology is an important component of success in process improvement efforts in large organizations. While there are areas of the Framework that need further development, especially in the change management area, it does deal with virtually all elements found in the process improvement programs used in these organizations.

- The Department already "owns" the methodology; there is nothing to buy.
- The Framework is based on and is compatible with DoD 8020.1-M (Functional Process Improvement), and it is compatible with the DoD Enterprise Model.
- The Framework is vendor-independent and as such provides a neutral resource for use by all contractors and Department employees.
- The Framework is comprehensive and covers all facets of process improvement from definition of functional mission through deployment of the improved process.
- The Framework is consistent with the principles ordained by such authorities as Deming, Juran, Taguchi, Davenport and others.
- The concept of a single methodology supports the cross-functional teaming efforts needed to address complex functional processes.
- Training programs developed to support process improvement are based on a common set of concepts, principles, methods, techniques and tools that optimize training time and expenditures.
- We are able to develop a DoD-wide experience base for process improvement founded upon a common methodology.
- The Framework is compatible with techniques and tools already established in the Department, such as IDEF and groupware.

The Framework describes 25 clearly defined steps, organized into six phases, which guide functional users through the improvement process from mission definition or clarification through post-implementation review. These phases and steps are supported by over 20 techniques and tools, most of which can readily be used by functional managers and employees. The Framework concept provides for an

integrated documentation, training, and support package, which, when completed, will be a candidate for recognition as a world-class process improvement methodology.

Conceptually, the Framework supports a concept called Total Systems Management (TSM), which is our own construct. TSM recognizes *process* as the integrating factor for a complex series of interrelationships involving customers (products and services), suppliers (data and materials), resources (employees and facilities), and mission (requirements and constraints). Process improvement consists of optimizing these interrelationships in terms of cost, cycle time, productivity, and quality/service. The Framework emphasizes metrics and measures based on data collected and evaluated through the use of both analytic and synthetic techniques. Because the Framework relates planning to performance through metrics, it is entirely consistent with the Government Performance and Results Act.

Joseph Juran, one of the pioneers in quality management and process improvement, gives three imperatives for implementing great change in an organization: unwavering commitment from senior leadership, a context for coordinating change throughout the organization, the necessary tools to be employed in bringing about the change.[3]

Chart 1 on the next page illustrates the components of the methodology. They include abstracts, briefings, tutorials, guidebooks, templates, and checklists, documentation, training and support components for each phase or step in the methodology.

Chart 2 on the following pages shows the six phases and 25 steps of the methodology. These materials provide functional managers, project leaders, process action team members, trainers, consultants, and support staff personnel with a complete program in support of process improvement activities. These components are fully described in the *Framework for Managing Process Improvement Guidebook.*

[3] *Juran on Quality by Design*, J. M. Juran, 1992.

Management Framework Organization (Chart 1)

METHODOLOGY PHASES AND STEPS						
	MANUALS	Functional Process Improvement Phase/Step Specifications Manual				
		Functional Process Improvement Project Management Handbook				
		Functional Process Improvement Training Plan				
	ACTIONS	DEFINE	LEARN	RELATE	PERFORM	EVALUATE
		Abstract	Tutorial	FPIP Guidebooks	Templates	Checklist
		Briefing Package	Qualifier	Seminar Leader's Guidebook	Quick Reference Cards	Assessment
			Classroom Modules	Groupware Facilitator's Guidebook		Evaluation
			Distance Learning Modules	Self-directed Case-study Guidebook	Project Planning Aids	
	SUPPORT	Techniques and Tools				
		Products				
		Models	Examples	Case Studies	Success Stories	Benchmark Best Practice
		Resources	Trainers & Facilitators	Hotline Support	Methodology Experts	Contract Availability
		References	Policy & Guidance	Rules & Regulations	Books & Publications	

Methodology Phases and Steps (Chart 2A)

	PHASE/STEP DESCRIPTION
A1	ESTABLISH PROJECT FRAMEWORK
1	SECURE EXECUTIVE COMMITMENT FOR FUNCTIONAL PROCESS IMPROVEMENT PROJECT
2	CONFIRM/DEFINE FUNCTIONAL MISSION
3	DEVELOP STRATEGIC PLAN
4	CONDUCT STRATEGIC/CUSTOMER BENCHMARKING AND BEST PRACTICES ANALYSIS
5	DEVELOP BUSINESS PLAN
6	IDENTIFY, UNDERSTAND, AND DOCUMENT CURRENT BUSINESS PROCESSES
7	DOCUMENT THE FUNCTIONAL ARCHITECTURE
8	INITIATE FUNCTIONAL PROCESS IMPROVEMENT PROJECT
A2	DOCUMENT AND ANALYZE CURRENT BASELINE
9	REVIEW, REVISE, OR DEVELOP AS-IS ACTIVITY MODELS FOR SELECTED PROCESS
10	REVIEW, REVISE, OR DEVELOP AS-IS DATA MODELS FOR SELECTED PROCESS
11	PERFORM ACTIVITY-BASED COSTING STUDY OF AS-IS PROCESS
12	CONDUCT COST/PROCESS BENCHMARKING AND BEST PRACTICE ANALYSIS WITH RESPECT TO AS-IS MODELS
A3	PERFORM PROCESS IMPROVEMENT ANALYSIS
13	PERFORM FUNCTIONAL PROCESS IMPROVEMENT ANALYSIS
14	DEVELOP PROCESS IMPROVEMENT INITIATIVE PACKAGES (FOUR CLASSES)
15	DEVELOP POTENTIAL HIGH-LEVEL TO-BE ACTIVITY AND DATA MODELS

Methodology Phases and Steps (Chart 2B)

	PHASE/STEP DESCRIPTION
16	REVISE IMPROVEMENT INITIATIVE PACKAGES BASED ON TO-BE MODELS
17	SELECT INITIATIVE PACKAGE BASED ON ECONOMIC ANALYSIS OF POTENTIAL ALTERNATIVES
18	DEVELOP DETAILED TO-BE ACTIVITY AND DATA MODELS BASED ON SELECTED INITIATIVE PACKAGE
A4	DEVELOP MANAGEMENT PLAN AND FEA
19	DEVELOP PRELIMINARY FUNCTIONAL ECONOMIC ANALYSIS (FEA) DECISION PACKAGE
20	DEVELOP DATA MANAGEMENT AND TECHNICAL MANAGEMENT PLANS
21	DEVELOP FINAL FUNCTIONAL ECONOMIC ANALYSIS (FEA) DECISION PACKAGE
22	DEVELOP PROJECT/ACTION/TRANSITION PLANS (Change Management Program)
A5	REVIEW AND APPROVE PROGRAM
23	CONDUCT EXECUTIVE PRESENTATIONS
A6	EXECUTE BPR PROGRAM DECISIONS
24	EXECUTE APPROVED FEA
25	EVALUATE RESULTS, UPDATE BASELINE DATA, AND DOCUMENT LESSONS LEARNED

End of Report